REDES NEURAIS COM TENSORFLOW

DIEGO RODRIGUES DSC

INFNET

Agenda

Parte 1 : Séries Temporais 101

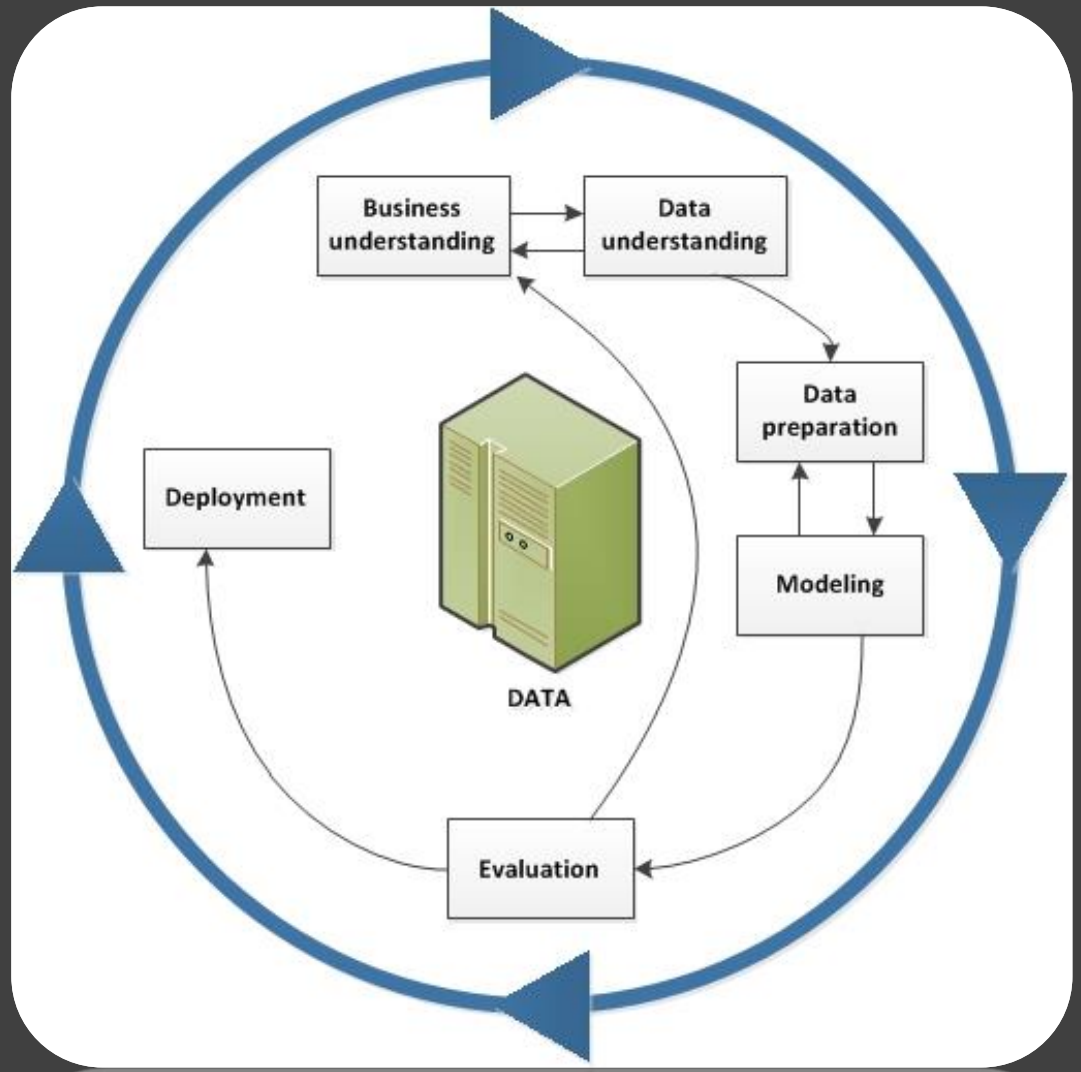
- Séries Temporais
- Abordagem
- Análise Exploratória
- Decomposição
- Regressão Auto-Vetor
- Redes Neurais Recorrentes

Parte 2 : Prática

- Notebook: Air Quality Temperature

Parte 3 : Trabalhos

- Escopo & Evolução



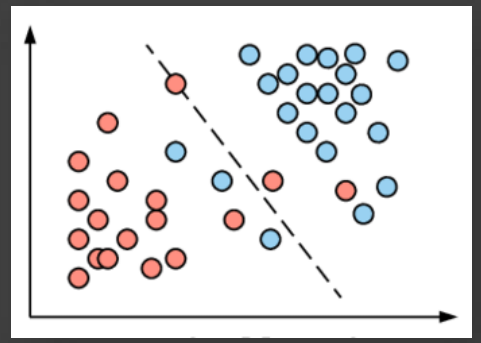
Cross Industry Process for Data Mining (CRISP-DM)

Novo Ciclo CRISP

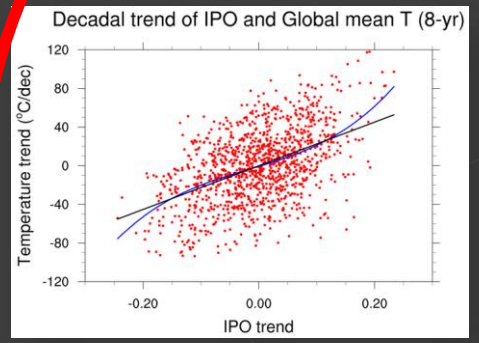
Algoritmo	Representação	Preparação	Modelagem	Validação
• Reta 2 Pontos	• 2D	• Nenhuma	• Reta 2 Pontos	• Nenhuma
• NN 10% VAL	• 2D	• Nenhuma	• 1 Neurônio	• Precisão/Recall
• NN 10 Folds	• 2D	• Scale	• 1 Hidden	• Precisão/Recall
• PS10	• 4D / 3 Classes	• Scale	• 1 Hidden	• Acurácia
• PS10	• 7D / 1D Regressão	• Scale	• 1 Hidden	• MSE
• SOM	• 4D	• PCA	• SOM 10x10	• MSE
• NN(T/V/T)	• 1D 2 Lags	• Scale	• 1 Hidden	• MSE

- Regressão Séries Temporais com 2 Lags

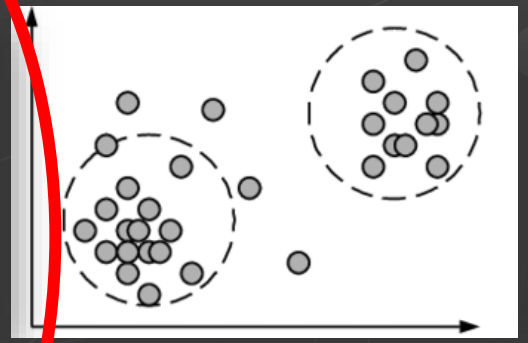
Paradigmas de Modelagem Estatística



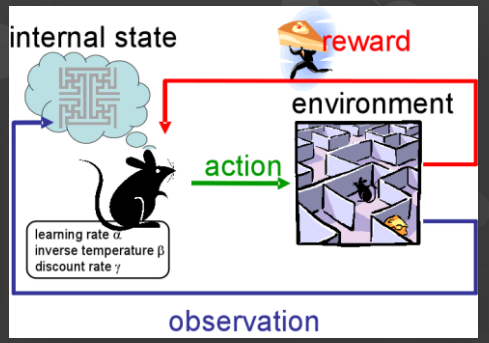
SUPERVISIONADO – CLASSIFICAÇÃO



SUPERVISIONADO – REGRESSÃO

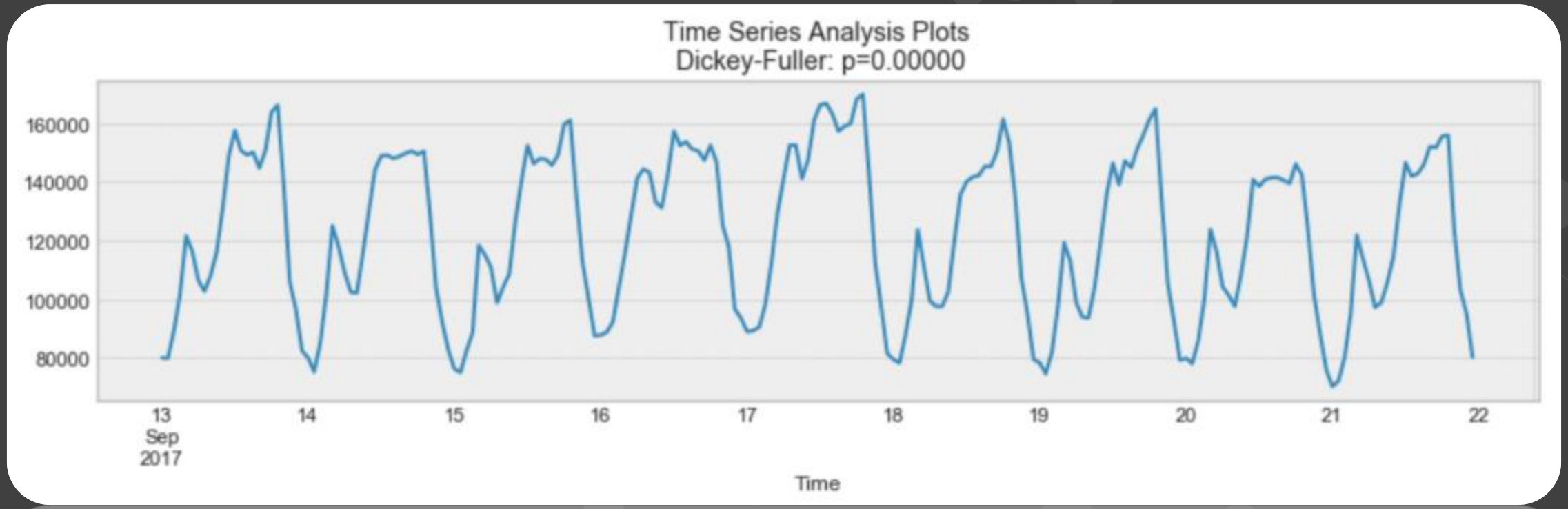


NÃO SUPERVISIONADO



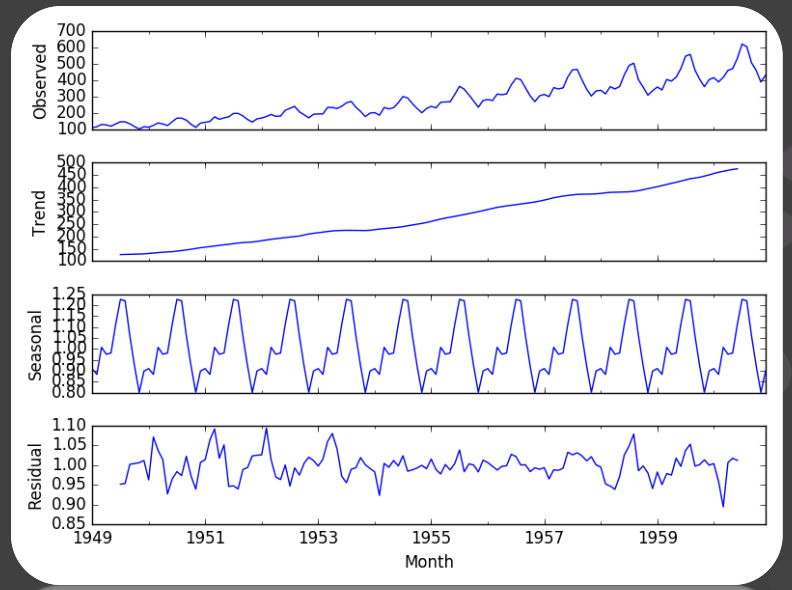
APRENDIZADO POR REFORÇO

Séries Temporais

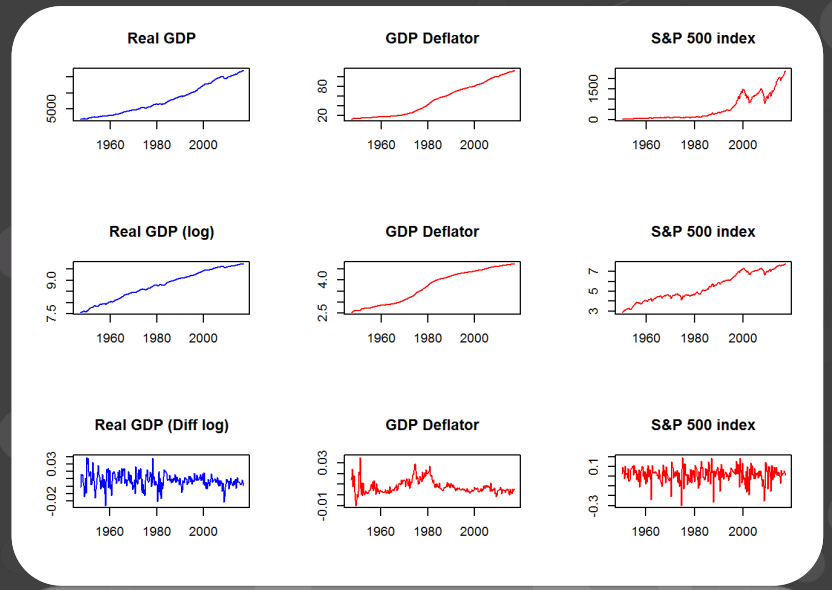


Abordagens

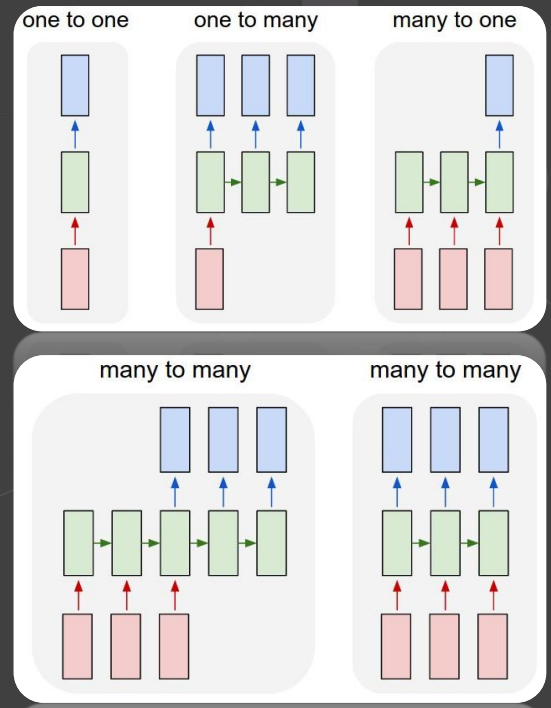
Decomposição



Regressão auto-vetor

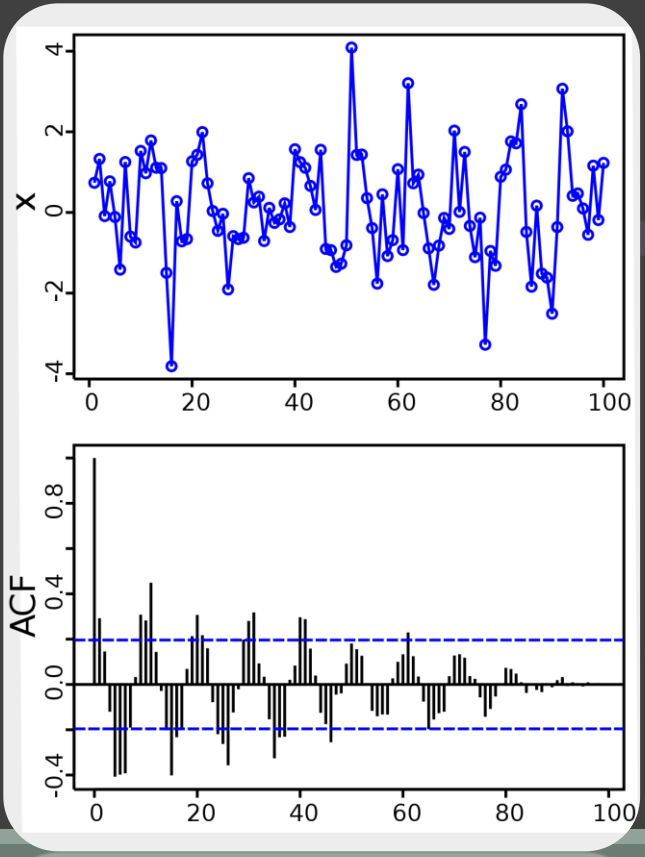


Rede Neural Recorrente

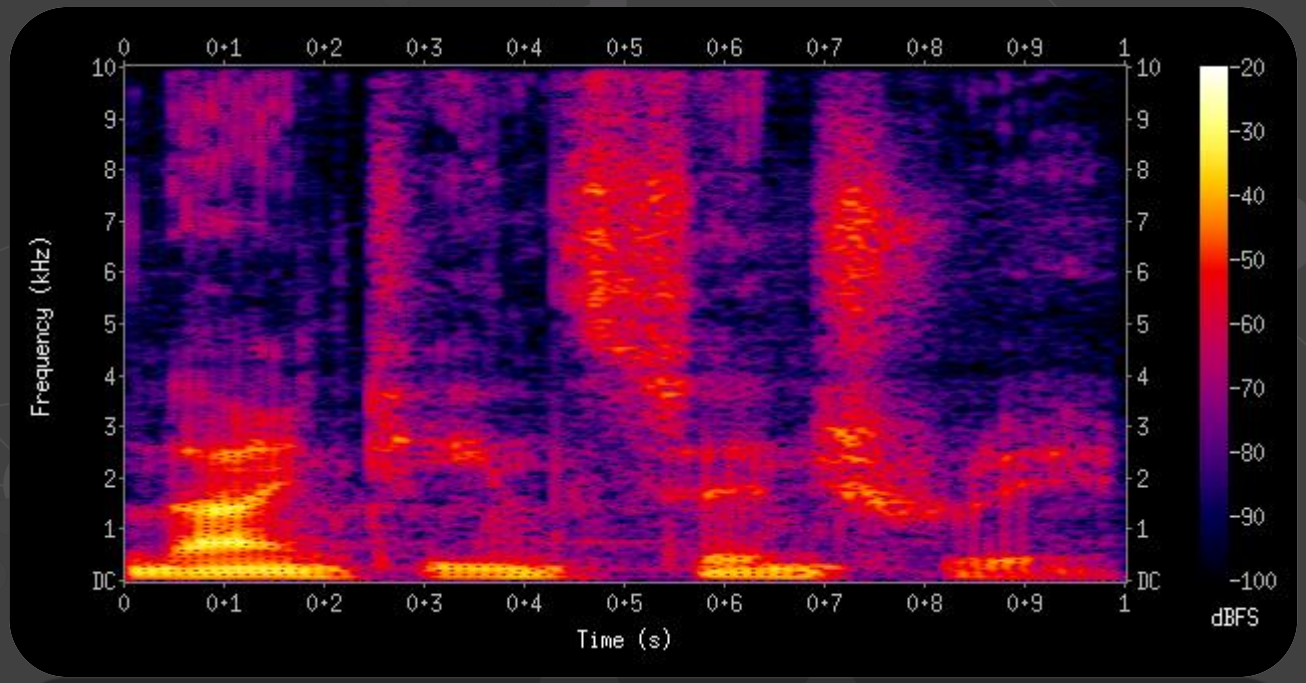


Análise Exploratória

Auto-correlação

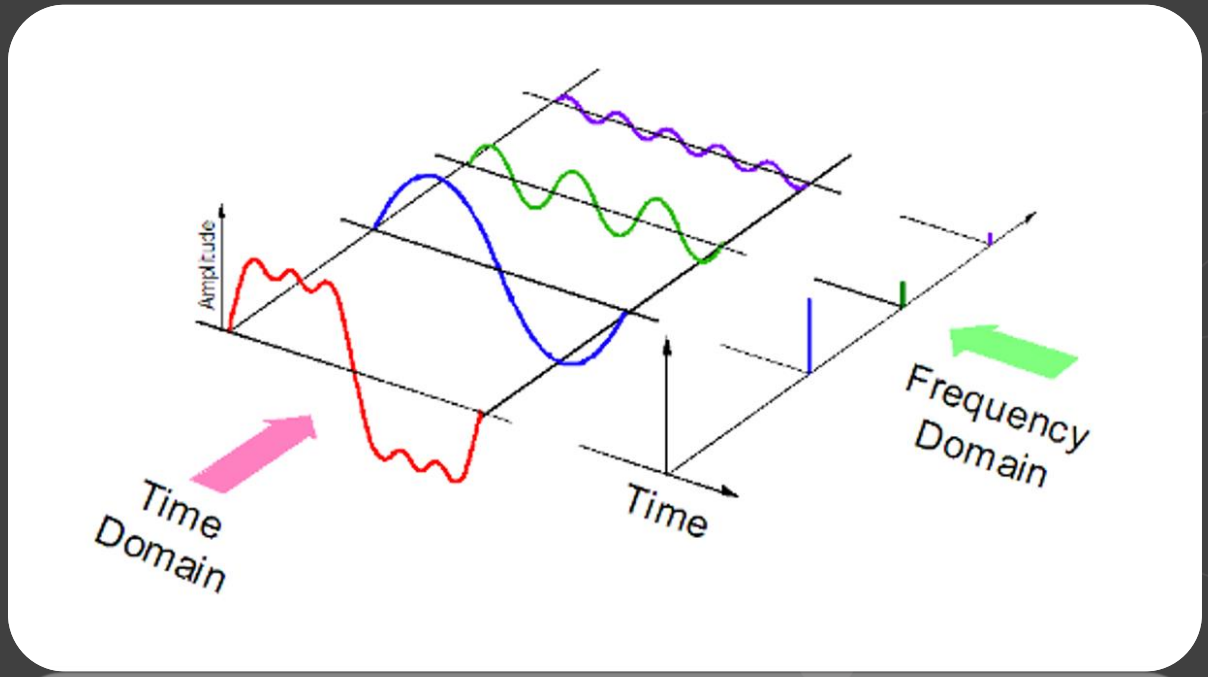


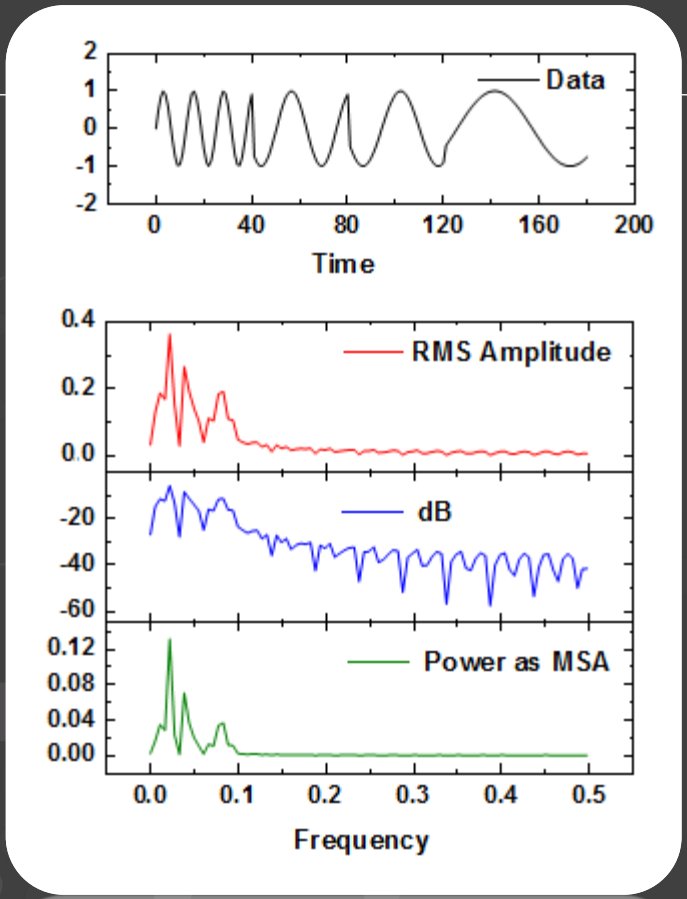
Espectograma



Análise Exploratória

Transformada de Fourier





Decomposição

$$y_t = T_t + C_t + S_t + I_t\,,$$

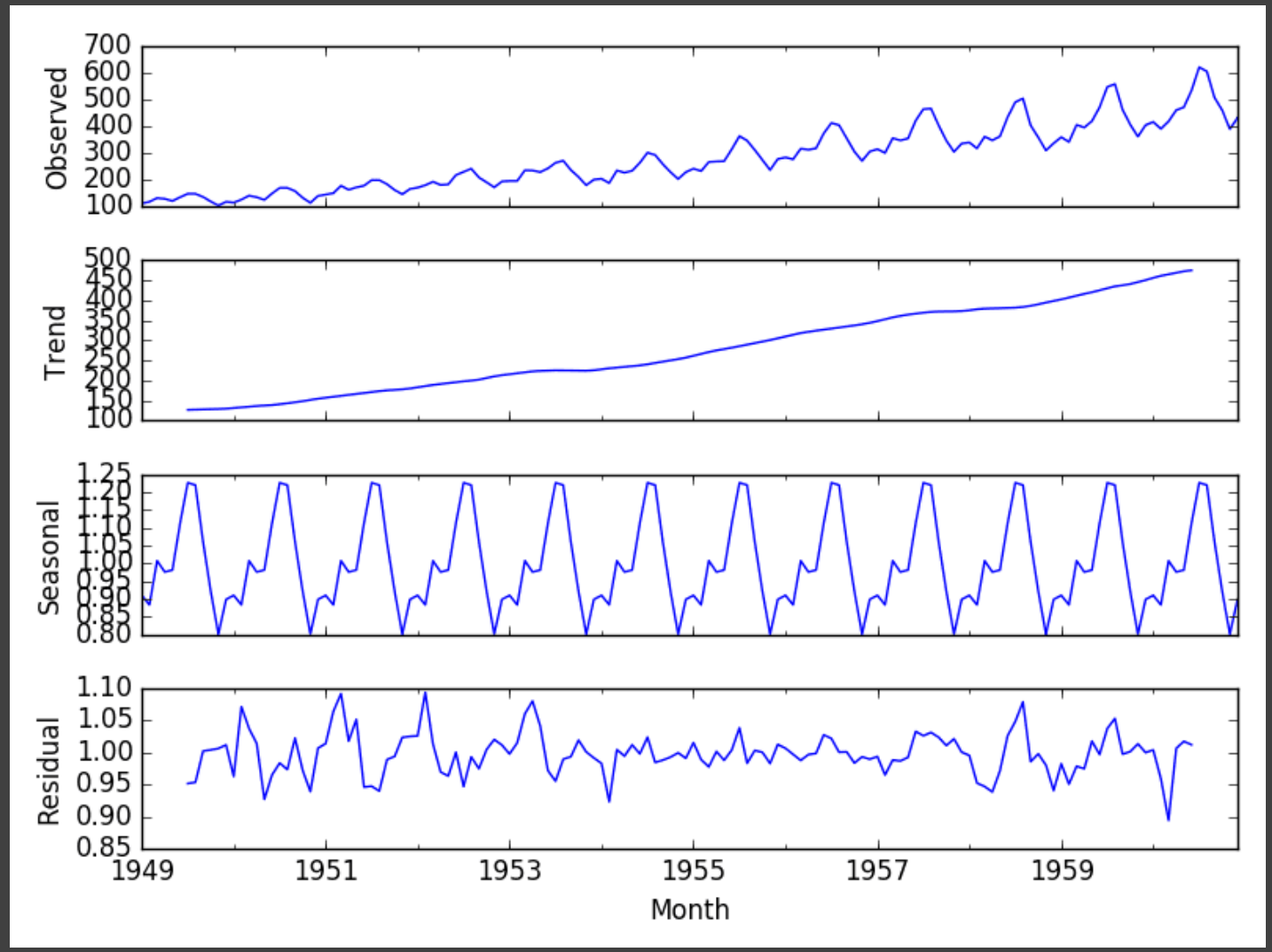
$$y_t = T_t \times C_t \times S_t \times I_t\,.$$

Tt : média / média móvel

Ct: Fourier Passa Baixas / Média Móvel

St: Fourier Passa Altas / Picos Remanescentes

Ii: auto-regressão / rede neural



Decomposição

Regressão Auto-Vetor

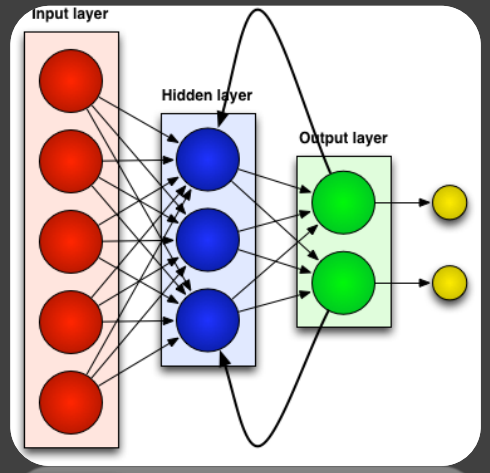
Univariada

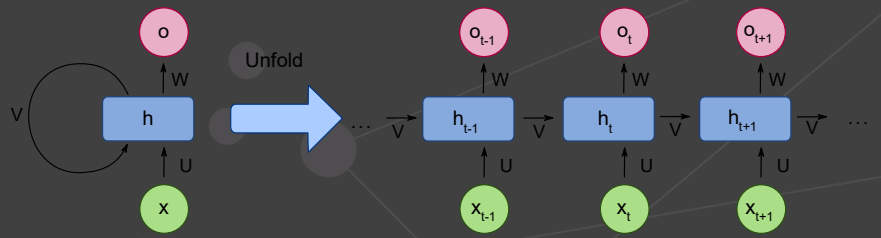
$$X_t = c + \sum_{i=1}^{p} \varphi_i X_{t-i} + \varepsilon_t$$

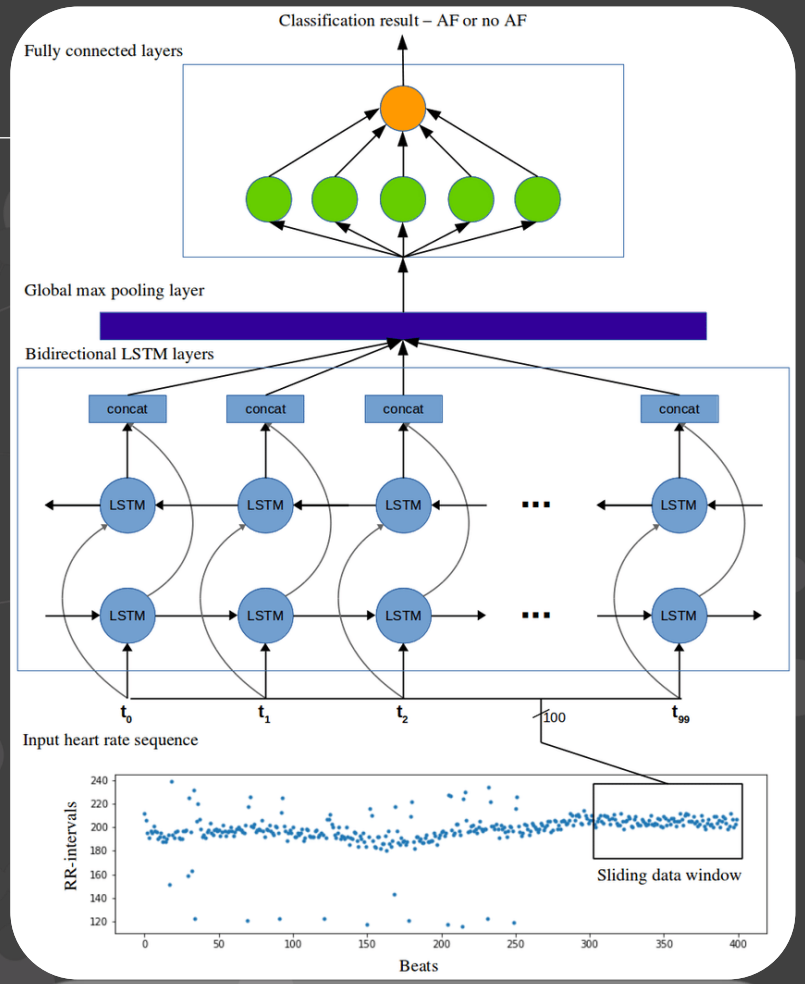
Multivariada

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_p y_{t-p} + e_t,$$

Rede Neural Recorrente







AirQuality Temperature

Modelagem

Rede Neural com Lags (Auto-Regressão)

- 2 lags -> dia seguinte
- 1 Camada Oculta Relu
- Treinamento: (T/V/T)
  - MSE